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PATENT
Atty Docket No.: 10007965-1

In The U.S. Patent and Trademark Office

In Re the Application of:

Inventor(s):	Jun Li et al.	**Confirmation No.:**	9833
Serial No.:	09/955,764	**Examiner:**	Rutten, James D.
Filed:	September 19, 2001	**Group Art Unit:**	2192
Title:	RUN-TIME MONITORING IN COMPONENT-BASED SYSTEMS		

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I hereby certify that this correspondence is being transmitted to the Patent and Trademark Office facsimile number (571) 273-8300 on June 4, 2007. This correspondence contains the following document(s):

1 sheet of Transmittal of Reply Brief.

11 sheets of Reply Brief.

Respectfully submitted,

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June 4, 2007

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PATENT APPLICATION
ATTORNEY DOCKET NO. 10007965-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

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TRANSMITTAL OF REPLY BRIEF

Sir:

Transmitted herewith is the Reply Brief with respect to the Examiner's Answer mailed on April 2, 2007. This reply Brief is being filed pursuant to 37 CFR 1.193(b) within two months of the date of the Examiner's Answer.

(Note: Extensions of time are not allowed under 37 CFR 1.136(a))

(Note: Failure to file a Reply Brief will result in dismissal of the Appeal as to the claims made subject to an expressly stated new grounds of rejection.)

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Respectfully submitted,

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Rev 12/04 (ReplyBr)

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REPLY BRIEF

The Appellant respectfully submits this Reply Brief in response to the Examiner's Answer mailed on April 2, 2007. This Reply Brief is hereby submitted with two months of the Examiner's Answer because June 2, 2007 is a weekend day.

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I. STATUS OF CLAIMS

All pending Claims 1-43 stand rejected.

Pursuant to 37 C.F.R. § 41.37, the Appellant hereby appeals the Examiner's decision finally rejecting Claims 1-43 to the Board of Patent Appeals and Interferences. Therefore, Claims 1-43 of this application are at issue on this appeal.

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II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

a) Whether Claims 1-7, 9-11, 13-19, 21-32, and 35-42 should have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kazi et al. ("JaViz: A Client/Server Java Profiling Tool") in view of Blumson et al. ("Automatic Insertion of Performance Instrumentation for Distributed Applications") and further in view of Delucia et al. (U.S. Patent Number 4,819,233) and Tucker et al. (U.S. Patent Number 6,151,639).

b) Whether Claims 8, 12, and 43 should have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kazi et al., Blumson et al., Delucia et al., and Tucker et al. as applied to claims 7, 9, and 36, respectively, and further in view of Courant et al. (U.S. Patent Number 5,522,073).

c) Whether Claim 20 should have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kazi et al., Blumson et al., Delucia et al., and Tucker et al. as applied to claim 9 and further in view of Brandle et al. (U.S. Patent Number 5,146,593).

d) Whether Claims 33 and 34 should have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kazi et al., Blumson et al., Delucia et al., and Tucker et al. as applied to claim 29 and further in view of Peek et al. ("Unix Power Tools").

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III. ARGUMENTS

A. The Combination of Kazi et al., Blumson et al., Delucia et al., and Tucker et al. Do Not Disclose the Features Recited in Claims 1-7, 9-11, 13-19, 21-32, and 35-42

In the Response to Arguments section of the Examiner's Answer, the Examiner continues to reject the claimed "global causal identifier" in independent Claims 1, 29, and 36 with the "method identifier" as described in Kazi et al. (*See* Examiner's Answer on pp. 20-23 to support the use of "method identifier" on p. 5 to reject the claimed "global causal identifier." the Examiner also alleges that,

> Appellants have not provided any technical explanation how Kazi's disclosed call causality tracking occurs without identifiers. To this end, Appellants' arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

It appears that the Examiner possesses a full technical understanding of neither the claimed invention nor the numerous references the Examiner used to reject the claimed invention.

As background information, in a remote object invocation system, such as the JaViz system that employs remote method invocation (RMI) in Kazi et al. and the Object Request Broker (ORB) in Tucker's system, the object needs to be created first at the server (in the case of Kazi et al., the Jvm 2 in Figure 3), and then has its object reference published remotely to a registry. Such an object publishing is briefly described beginning on p. 17, after Figure 10 in Kazi et al. "1. Start rmiregistry_g." Subsequently, a client (in the case of Kazi, in Jvm 1 of Figure 3) that is interested in invoking the object then discovers the object reference from the registry. The client's invocation is actually through a stub, as stated in Kazi et al., "...where the Facotry_Warehouse_Class_Stub instance is a client-side dummy of

the remote object...." on p. 8, second paragraph. With the target object information encoded in the obtained object reference, the stub knows how to send the message to the object (located remotely), and gets back the response message.

Accordingly, in a complete system running picture in Kazi et al. and Tucker et al., an object must be published (through its object reference) and object discovery must be performed, in two phases, before the client can make an invocation of such an object to the server (the invocation phase). The JaViz system in Kazi et al. focuses only on the invocation phase.

Different remote object invocation systems can have different ways to encode object references. However, in general, all legitimate object references have to encode a global unique identifier that can uniquely identify a distributed object in the entire distributed system, in order to be remotely invoked. Let's call this global unique identifier the **Global Object Identifier for Remote Invocation (hereinafter "global object identifier").** In the JaViz system of Kazi et al., such a global object identifier is the aggregation of the "method identifier," "object identifier," "machine name," and "port number." Thus, the "method identifier" by itself cannot be a global object identifier because, as stated in Kazi et al., "each method that can be remotely invoked in an exported object is also given a **unique (within a class)** identifier by the RMI module..." (Kazi et al., p. 8, 3rd paragraph). The "object identifier" by itself cannot be a global object identifier either; otherwise, the machine name recording is not necessary, "to match correspondingly entries in the server and client profiles, the modified JVM also **records the machine (Jvm) names.**" (Kazi et al., p. 9, 1st paragraph). Furthermore, even the introduction of the "machine name" is not enough, because "the port number is needed to distinguish between remote calls made to the same server from different

Jvms residing on the same physical machine (Kazi et al., p. 9, 1st paragraph). Thus, in Kazi's system, the global object identifier requires at least the combination of the method identifier + object identifier + machine name + port number. In other words, any one or subset of these identifiers will not be able to uniquely determine an object in the distributed system.

Such a Global Object Identifier for Object Invocation, or global object identifier, is also required in Tucker's system, as evidence by "...the global xdoor identifier 140 is coupled with the node identifier 142 to produce an identifier that uniquely identifies the object within the distributed system 100," (Tucker et al., Column 4, lines 27-30). That is, the global object identifier in Tucker et al. at least contains a combination of the global xdoor identifier + node identifier. As noted earlier, Kazi's system, and any other system monitoring tool that deals with remote call tracing, can only invoke an object after its object reference has been published, and the client discovers the associated object reference. Thus, the global object identifier **is created** at the time the object is published and subsequently acquired by the client when the object reference is discovered by the client.

In contrast, the "global causal identifier" as coined by the Appellants and claimed is completely different from the aforementioned global object identifier. As defined in the present application, e.g., in at least Paragraph [0059], the claimed global causal identifier is designed to keep track of the entire call chain happened in the distributed system. The causality herein refers to the "function parent/child relationship" in particular. An example of chain can be "component A's method 1 calls component B's method 2 which then further calls component C's method 3". That is, A.1→B.2→C.3 forms a call chain. Furthermore, as stated in the present application, Paragraph [0041], "[i]t should be understood that the first software component may not necessarily invoke other software components. However, if

subsequent software components are invoked, the monitoring method according to the invention can track and log the causality relationship between components, enabling a complete picture of software component execution within the distributed system 100."

Accordingly, in the novel monitor method and system of the claimed invention, the "global causal identifier" is created independent of the Global Object Identifier for Object Invocation. This latter identifier is still necessary to enable the method invocation under the monitoring. However, the global causal identifier is created at the stub side, at the time the first call in the call chain is invoked. The purpose of this global causal identifier is to tag all the calls in the same call chain, such that they share the same global causal identifier. "The method of the invention enables characterization of causality chains initiated by a user-defined software component. This is done by propagating Global Causal Identifier between the stub and the skeleton, and by using local ordering of stub and skeleton events in combination with an event sequence numbering to give a total ordering over the call chain. Therefore, the log data can be analyzed and sorted to provide individual characterization data for particular causality chains" (Paragraph [0057]). "All function invocations which shares an identical Global Causal Identifier (GCID) are ordered based on increasing Event Numbers (each function invocation contains a stub and a skeleton." A dynamic call graph is produced from the ordered, collected log data." (Paragraph [0070]). "In order to accomplish causality relationship tracing, the invention records the following information at all four probes: A **global causal identifier** (GCID), the local function identifier, an **Event**, and **Event Number**, and a Thread identifier, and a Marker.." (Paragraph [0100]).

With the claimed global causal identifier, the difference between the claimed invention and that of Blumson et al. is clear. Although Blumson et al. also uses the

instrumented stub and skeleton, its monitoring system only captures single client/server call pairs, as shown in the measurement results in Table 1 and Table 2, on p. 9 of Blumson et al. That is, Blumson's system is not designed to capture the call relationship in the call chain. For example, the call chain of A.1→B.2→C.3. Blumson's system can only capture A.1→B.2 and B.2→C.3. Thus the transitive call relationship is not captured.

In recap, because the claimed "global causal identifier" is coined by the appellants and recited throughout the pending claims 1-43, each instance of the global causal identifier must be accorded the same meaning as defined in the present application. *See* MPEP 2111.01 IV, which entitles Appellants to be his or her own lexicographer for new terms, and the Appellants' definition of the new terms in the application disclosure will control interpretation of such terms as they are used in the claims.

Because the references as cited (Kazi et al., Blumson et al., Delucia et al., and Tucker et al.) neither disclose nor make obvious the claimed "global causal identifier" as defined by the Appellants, it is respectfully submitted that the Examiner fails to establish a *prima facie* case of obviousness against Claims 1-7, 9-11, 13-19, 21-32, and 35-42. Accordingly, these claims are allowable over the references of record.

B. <u>The Combination of Kazi et al., Blumson et al., Delucia et al., Tucker et al., and Courant et al. Do Not Disclose the Features Recited in Claims 8, 12, and 43</u>

Claims 8, 12, and 43 is allowable over the references of record for at least the reasons set forth in A above. Furthermore, Claim 8 is allowable for at least the additional reasons below.

In the Response to Arguments section of the Examiner's Answer, the Examiner further states,

> But Kazi does not expressly disclose using regular expressions to provide the filtering. Courant teaches the use of regular expressions to filter data. See column 8 lines 26-32 supported by column 4 lines 57-61. Hence, Courant is not relied upon to teach "during said operation," since Kazi discloses it by the use of filters as set forth in the rejection of claim 8. Accordingly, Appellant's argument is moot and therefore not persuasive. (Examiner's Answer, p. 24).

The Examiner's statement that "Courant teaches the use of regular expressions to filter data" is incorrect. Courant uses regular expression to specify event pattern matching, in order to determine that when an event happens, what routines (or options) that match the specified pattern should be invoked. In Courant's system, regular expression is used for the purpose of chaining different software tools together to form a larger tool suite. It does not deal with log data as claimed at all.

Because the references as cited (Kazi et al., Blumson et al., Delucia et al., Tucker et al., and Courant et al.) neither disclose nor make obvious the use of "regular expression," it is respectfully submitted that the Examiner further fails to establish a *prima facie* case of obviousness against Claim 8.

C. The Combination of Kazi et al., Blumson et al., Delucia et al., Tucker et al., and Brandle et al. Do Not Disclose the Features Recited in Claim 20

Claim 20 is allowable over the references of record for at least the reasons set forth in A above.

D. The Combination of Kazi et al., Blumson et al., Delucia et al., Tucker et al., and Peak et al. Do Not Disclose the Features Recited in Claims 33 and 34

Claims 33 and34 are allowable over the references of record for at least the reasons set forth in A above.

V. CONCLUSION

For at least the reasons set forth above, it is respectfully submitted that the rejection of Claims 1-43 is clearly improper. The Appellant therefore respectfully requests that the Board of Patent Appeals and Interferences reverse the Examiner's decision rejecting Claims 1-43 and to direct the Examiner to pass the case to issue.

Respectfully submitted,

Dated: June 4, 2007 By

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